

The Effectiveness of Training Circuits in Volleyball Games

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ABSTRACT

This study is a quantitative description study that aims to determine the effectiveness of circuit training in volleyball games. The method used was a quantitative survey with data collection techniques using agility, strength, and endurance tests. The subjects in this study were volleyball games of students at SMAN 3 Pinrang totaling 30 people. Data analysis techniques use quantitative descriptive analysis in the form of percentages and requirements tests. Based on the results of research and discussion, the results of the Training Circuit on volleyball in SMAN 3 Pinrang students were agility of 33.33%, strength of 33.33%, and endurance of 33.33%.

Keyword: Circuit; Training; Volleyball

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INTRODUCTION

Volleyball is one of the sports that is popular with all walks of life. Volleyball is a team game played by two teams separated by a net and each team consists of 6 players (Sahabuddin, 2018). Volleyball is not only known as a sport of achievement but also as a recreational sport and a hobby dealer (Vai et al., 2018). This sport can be played from the level of children to adults, both men and women because the game of volleyball is an interesting sport (Wahyudi & Indahwati, 2019), fun, and does not require a large cost so it is done easily (Satria, 2019). Simply by requiring some friends, balls, nets, and empty land that can be used as a court, volleyball games can be played (Adha, 2019). This is one of the causes of the increasing popularity and popularity of volleyball games in the community (Pratiwi & Prayogs, 2019).

SMA Negeri 3 Pinrang is one of the schools in South Sulawesi that has several sports activities, one of which is volleyball. After observing the students of SMA Negeri 3 Pinrang during the volleyball learning process, that there are still many students who are not good at mastering the game of volleyball. The game of volleyball has some form of basic

techniques that a player needs to master (Sahabuddin et al., 2022). In the game of volleyball, several basic techniques must be mastered consisting of serve, bottom pass, top pass, block, and smash (Bekti & Yuliawan, 2018). Mastery of these basic techniques is essential to be able to play volleyball (Sahabuddin, 2020). To play volleyball well, one must understand or understand the basic techniques of the game of volleyball (Marsiyem et al., 2018) However, mastering the techniques in the game of volleyball is not an easy thing to do (Sahabuddin, 2019). The game of volleyball is also a game that uses a fast tempo (Baidawi & Maidarman, 2019), so the time to play volleyball is very limited and if you do not master the correct basic technique will allow for greater technical mistakes (Urahman & Hidayat, 2019). This study focused on the basic technique skills of passing under volleyball (Sahabuddin & Hakim, 2019). The bottom passing technique is a volleyball technique using two hands, namely the impact of the ball on the two forearms which aims to pass the ball to teammates to be played on their court or as a start to attack (Sahabuddin et al., 2020). The basic technique of passing down is very important for a volleyball player to master (Nasriani & Mardela, 2019) Because it is the first technique used to receive serves, and spikes/smashes (Sahabuddin et al., 2021). The factor that influences the bottom passing technique is the Training Circuit. The implementation of circuit training in volleyball is adjusted to the needs and characteristics of the game. Among them are elements of speed, agility, endurance, power, coordination, stamina, and other elements of physical condition.

In addition to the Training Circuit, other factors that affect lower passing techniques are such as arm strength, hand-eye coordination strength as well as balance and leg muscle strength. This study focused on arm muscles, hand-eye coordination, and leg muscle strength. Arm strength effectively plays the ball in performing bottom passing techniques. Strength is an important element in the human body, strength is a very important component to improve a person's overall physical condition (Vai et al., 2018). Strength is the ability of a group of muscles to withstand maximum load, in simple terms, strength can be interpreted as the ability to provide power against pressure. Strength is the ability of muscles that overcome resistance or load in carrying out activities (Asnaldi, 2020).

In addition to arm muscle strength, eye and hand coordination also has effectiveness against bottom passing techniques performed by a volleyball player. Coordination is the ability to string together several movements to achieve a movement that follows the purpose (Herman, 2019). Student sports learning achievement is physical coordination. Physical condition is the passing of a whole unity and a component of physical freshness (Utomo, 2019). Motion skills are the ability to move effectively and efficiently (Jusran, 2019). To obtain maximum bottom passing results, you must go through several stages, namely the preparation stage, the movement stage, and the final stage of motion (Baqer & Bawono, 2019). Leg muscle strength is also very effective for the ability to pass under volleyball, especially in effectively balancing the body (Jahrir, 2019). Leg muscles are lower limbs consisting of some linen muscles or skeletal muscles. Leg muscles are muscles found in both legs, including lower leg muscles: anterior tibial muscles extension digitorium, longgus, poroneus longgus, oroneus longgus, gastrocnemius, soleus, while the upper leg muscles are tensor fosialata, abductor sartorius, rectus femoris, vastus lateralis and vastus medialis.

METHODS

The type of research used in this study is quantitative research, that is, research must compile variables of at least one hypothesis that states a causal relationship among the variables that occur. The variables studied include independent variables and dependent

variables that have been determined expressly by researchers since the beginning of the study. This study shows a causal relationship, namely: a causal relationship, where this is done to determine the effectiveness of the independent variable on the dependent variable. The variables in this study are the Training Circuit as an independent variable symbolized by (X) and the volleyball branch as a bound variable symbolized by (Y). The object of this study was students of SMA Negeri 3 Pinrang. The population in this study was all students. The sampling technique in this study was a random side technique by lottery so a sample of 30 students was obtained. The data collection technique in this study is a test. After all the research data was collected, namely arm strength, leg strength and hand-eye coordination against bottom passing in volleyball games. So to test the hypothesis proposed in this study, the data was compiled, processed and analyzed using computer assistance through the SPSS v.25 for Windows program.

RESULTS AND DISCUSSION

Based on the results of descriptive analysis of research on the effectiveness of the Training Circuit in volleyball games at SMA Negeri 3 Pinrang on the agility test, the lowest score (minimum) 6.11, the highest score (maximum) 9.86, the average (mean) 7.99, the median value (median) 8.11, the value that often appears (mode) 7.53, and standard deviation (std. deviation) .795. The full results can be seen in **Table 1** as follows:

Table 1.

Description of Agility Test

Variable	Types of Statistical Values	Statistical Value	Information
Training Circuit	N	30	Total
	Mean	7.99	Average rating
	Median	8.11	Middle Value
	Mode	7.53	Frequently Appearing Values
	Std.Deviation	.795	Standard Deviation
	Minimum	6.11	Lowest Value
	Maximum	9.86	Top Rated

Based on the results of descriptive analysis of research on the effectiveness of the Training Circuit in volleyball games at SMA Negeri 3 Pinrang on the strength test (push-up) obtained the lowest score (minimum) of 10.00, the highest score (maximum) 25.00, the average (mean) 15.96, the middle value (median) 15.00, the value that often appears (mode) 13.00, and standard deviation (std. deviation) 3.854. The full results can be seen in **Table 2.** as follows:

Table 2.

Description of Strength Test

Variable	Types of Statistical Values	Statistical Value
Training Circuit	N	30
	Mean	15.96
	Median	15.00
	Mode	13.00
	Std.Deviation	3.854
	Minimum	10.00
	Maximum	25.00

Based on the results of descriptive analysis of research on the effectiveness of the Training Circuit in volleyball games at SMA Negeri 3 Pinrang on endurance tests (sprint

running and push-ups) obtained the lowest score (minimum) 7.13, the highest score (maximum) of 11.12, average (mean) 9.32, middle value (median) 9.49, the value that often appears (mode) 9.53, and standard deviation (std. deviation) 1.141. The full results can be seen in **Table 3.** as follows:

Table 3.
 Description of Endurance Test

Variable	Types of Statistical Values	Statistical Value	Information
Training Circuit	N	30	Total
	Mean	9.32	Average rating
	Median	9.49	Middle Value
	Mode	9.53	Frequently Appearing Values
	Std.Deviation	1.141	Standard Deviation
	Minimum	7.13	Lowest Value
	Maximum	11.12	Top Rated

When displayed in the form of a diagram, the Training Circuit level data on volleyball bottom passing in students at SMA Negeri 3 Pinrang appears in **Figure 1.** Next:

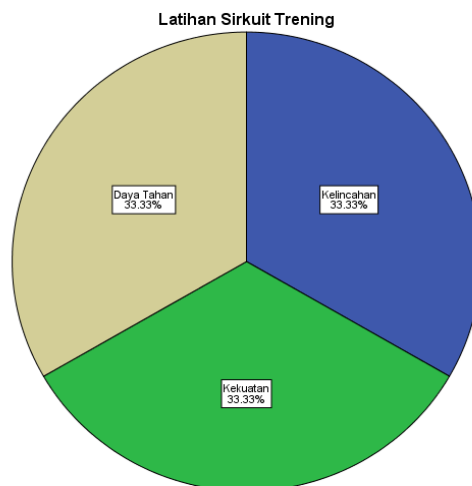


Figure 1.
 Pie Chart Level Circuit Training against Skills
 Volleyball at SMA Negeri 3 Pinrang

Based on **Figure 1**, shows that the level of circuit training in volleyball games in students at SMA Negeri 3 Pinrang obtained endurance of 33.33%, agility of 33.33% and strength of 33.33%. Thus, on average, the level of circuit training in volleyball games is the same amount.

Table 4.
 Data Normality Test Results

No.	Variable	Significant values based on the Kolmogorov-Smirnov test	Significant value based on the Shapiro-Wilk test	Information
1	Agility	0,200	0,426	Volleyball Games
	Strength	0,190	0,115	
	Durability	0,168	0,100	

By **Table 4** above, it can be seen that the results of data normality testing using the Kolmogorav-Smirnov and Shapiro-Wilk tests showed, that: Based on the above output, the significant value (SIG) for all data both on the Kolmogorav-Smirnov test and Shapiro-Wilk test >0.05 , it can be concluded that the research data are normally distributed. Because the

data is normally distributed, we can use parametric statistics (paired t-test and independent sample t-test) to analyze research data.

Table 6.
Data Homogeneity Test Results

No.	Heading	Significant Value
1.	The effectiveness of the Training Circuit in volleyball games for students at SMA Negeri 3 Pinrang.	0,100

Based on the output above, it is known that the significance value (sig) is $0.100 > 0.05$, so it can be concluded that the variance of training circuit data in volleyball games at SMA Negeri 3 Pinrang is the same or homogeneous.

Table 7.
Simple Linear Regression

No.	Heading	Constant	Power Value	Value Agility	Durability Value
1.	The effectiveness of the Training Circuit in volleyball games for students at SMA Negeri 3 Pinrang.	2,042	0.069	0.439	0,426

Table 7 shows a simple linear regression equation model as follows: $Y' = 2.042 + 0.069X_1 + 0.439X_2 + 0.426X_3$. Based on the equation model obtained, it is known that the constant value is 2.042, this means that if the training circuit is zero, then the volleyball game variable at SMA Negeri 3 Pinrang increases by 2.042 units.

Table 8.
Coefficient of Determination

No.	Heading	Value of Coefficient of Determination
1.	The effectiveness of the Training Circuit in volleyball games for students at SMA Negeri 3 Pinrang.	0,477

Based on **Table 8**, the coefficient of determination is 0.477 or 47.7 percent. This translates into the contribution of the training circuit to the game of volleyball by 47.7%.

Table 9.
Test F

No.	Information	Significant Value
1.	The effectiveness of the Training Circuit in volleyball games for students at SMA Negeri 3 Pinrang.	0,001

Table 9 shows a significance value of $0.001 < 0.05$. This means that the training circuit is simultaneously effective in volleyball games at SMA Negeri 3 Pinrang.

Table 10.
T Test

No.	Variable	Significant Value
1.	Strength	0,029
2.	Agility	0,007
3.	Durability	0,003

Table 10 shows that the significance value of each variable < 0.05 . This means that the training circuit is partially effective in volleyball games at SMA Negeri 3 Pinrang.

Discussion

Physical freshness can be interpreted as a person's ability to carry out daily activities efficiently, without experiencing significant defeat and still have energy reserves that can be used to enjoy free time. Therefore, physical freshness is very important for a sportsman and athlete. As is the case for volleyball participants at SMA Negeri 3 Pinrang, they need more stamina to practice compared to other students. Volleyball is a team sport played by two teams, each team consisting of six (6) people, playing on a court with a size of 18 X 9 meters. Referring to the purpose of the study is to determine whether there is effectiveness of the Training Circuit on the ability of volleyball sports in students at SMA Negeri 3 Pinrang, by looking at the results of the analysis obtained from research on students at SMA Negeri 3 Pinrang with the training circuit, the hypothesis proposed is accepted, namely that there is a significant effectiveness between the Training Circuit in volleyball games at SMA Negeri 3 Pinrang students. This is shown by the F test which obtained a significance value of $0.005 < 0.05$ which means that the training circuit has significant effectiveness in volleyball games in SMA Negeri 3 Pinrang students. It was also shown by the homogeneity test of the sample which obtained a significance value (sig) of $0.100 > 0.05$ which means that the Training Circuit has the same or homogeneous effectiveness in volleyball games at SMA Negeri 3 Pinrang. This research is supported by research conducted by Ifat Fajaruddin (2016) entitled "The Effect of Circuit Training on Increasing Vo2max and Muscle Endurance in Club Ardila Fc Pekalongan Football Players Aged 18-20 Years" the results of research with different tests (t-tests) vo2 max obtained t-count values of $11.039 > t\text{-table } 2.180$ and muscular endurance obtained t-count values of $21.562 > t\text{-table } 2.180$ so that the hypothesis was received with a significance level of $0.00 < 0.05$. Thus it is declared significant. In conclusion, there is an effect of circuit training on increasing VO2 Max and muscle endurance in Club Ardila Fc Pekalongan football players aged 18-20 years. This research is also supported by research conducted by Sigit Nugroho (2008) entitled "The Effectiveness of Circuit Training on Aerobic Endurance (Vo2 Max) PKO Students of the Faculty of Sports Sciences, Yogyakarta State University" with the results of research that there is an effectiveness of circuit training on increasing aerobic endurance (VO2 Max) by 43.10%. Identified PKO FIK UNY students for ages 20 to 22 years overall after doing circuit training (circuit training) aerobic endurance (VO2 Max) in the classification of Good (43 to 52) and High (> 53). From 12 samples of FIK UNY students after doing circuit training, 6 athletes whose aerobic endurance (VO2 Max) was included in the good classification (Good) and as many as 6 athletes whose aerobic endurance (VO2 Max) was in the high classification (High). Furthermore, another study conducted by Arif Cahyanto (2014) with the research title "The Effectiveness of Circuit Training on Improving Physical Fitness and Vo2max in Football Extracurricular Students at SMP Negeri 2 Batanghari" the results of research that Circuit Training can improve Physical Fitness with a significant level of 0.05 with a value of 13.119%, t-calculate (58,680) $>$ with t-table (2,060). And can increase VO2Max with a significant level of 0.05 with a value of 4.437%, t-calculate (38.107) $>$ with t-table (2.060). In conclusion, Circuit Training has greater effectiveness on Physical Fitness (13,119) than VO2Max (4,437).

The implication of the results of this study should be to improve Physical Fitness and VO2Max better use the type of Circuit Training because this training model consists of several posts each post can be made an exercise model with the aims and objectives to be achieved. Then research conducted by Mia Kusumawati (2014) with the research title "The Effectiveness of Circuit Training on the Endurance of Jakarta Futsal Swap Athletes in the Indonesia Futsal League (IfL) 2013" with the results of research that Circuit training provides significant effectiveness in increasing endurance through statistical calculations obtained t-count = 4.8 which is greater than t-table = 2.26 at the level of significance $\alpha = 0.05$ and dk

= 9. Thus, the hypothesis proposed by the researcher was accepted, so the Training Circuit provided a significant increase in the endurance of futsal athletes.

The results of the study also reinforced the theory developed by Morgan and Adamson (1953) at the University of Leeds in England (Wilmore, 1977) that an exercise system that can simultaneously improve the overall fitness of the body, namely, the components of power, endurance, speed, flexibility, mobility, and other physical components is circuit training because the forms of exercise in circuit training are usually a combination of all physical elements. This research is also supported by Soekarman's opinion (1987) that "circuit training is an exercise program combined from several exercise items whose purpose in doing an exercise will not be boring and more efficient. Circuit training will include exercises for (1) Muscle strength, (2) Muscular endurance, (3) Flexibility, (4) Agility, (5) Balance, and (6) Cardiopulmonary endurance". Then the theory developed by Yudiana (2010) that: "Circuit training is an exercise system that can simultaneously improve the overall fitness of the body, namely the elements of power, endurance, strength, agility, speed, and other components of physical condition. And reaffirmed by Harsono's opinion (1988) that "an exercise system that can simultaneously improve the overall fitness of the body, namely the components of power, endurance, speed, flexibility, mobility, and other physical components is circuit training.

The advantages of training with circuit training models include: (1) Training heart strength and lowering blood pressure as well as aerobic exercise, (2) Improving various components of physical condition simultaneously in a relatively short time, (3) Endurance, muscular endurance will be trained and adaptability increases, (4) Each athlete can train according to their progress, (5) Each athlete can observe and assess his progress. (6) Does not require expensive gym equipment, (7) Can be adjusted in various areas or training places, (8) Exercises are easy to supervise, and (9) Save time and can be done by many people at once. Based on the results of previous research and the opinions of the experts above, it can be concluded that circuit training can improve all physical components of the body such as training endurance, strength, agility, power, speed, flexibility, mobility, and other physical components, namely flexibility, balance, muscle strength, muscle flexibility in every sport both football, badminton and volleyball. The results showed that the training circuit had positive and significant effectiveness in volleyball games in students of SMA Negeri 3 Pinrang.

CONCLUSION

After obtaining the results of research and discussion, it can be concluded as follows the effectiveness of the training circuit in student volleyball games at SMA Negeri 3 Pinrang. Based on the conclusions above, several suggestions can be conveyed, namely: For students; To further improve the game of volleyball by conducting circuit training. For coaches; To pay more attention to students who still have fewer volleyball games, to always provide motivation and training circuit programs. The next researcher wants to conduct research with a wider sample and population, which is related to research on the game of volleyball.

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